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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,176	08/30/2006	Atsushi Sano	129277	7454

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EXAMINER	
TURNER, KATHERINE ANN	
ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/591,176	SANO ET AL.	
	Examiner	Art Unit	
	Katherine Turner	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) *1-6 and 9-14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7,8 and 15-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/30/2006, 3/11/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. The restriction requirement mailed on December 3, 2008 has been withdrawn, because there was an error in the assignment of the claims to the groups. A new corrected restriction requirement has been made, and the Applicant has made a provisional election during a telephone conversation. Below is the new corrected restriction requirement.

2. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claims 1-6 and 9-12, drawn to a direct alcohol fuel cell, wherein the cathode catalyst layer contains a metal complex and/or a metal complex fired product formed by firing the metal complex as a catalyst.

Group II, claims 7-8 and 15-17, drawn to direct alcohol fuel cell wherein the cathode catalyst layer contains silver and the solid polymer electrolyte membrane is an anion exchange membrane.

Group III, claim 13, drawn to method of manufacturing a direct alcohol fuel cell, forming the cathode catalyst layer by using a metal complex and/or a metal complex fired product formed by firing the metal complex; and forming the solid polymer electrolyte membrane by plasma polymerization.

Group IV, claim 14, drawn to method of manufacturing a direct alcohol fuel cell, forming the cathode catalyst layer by using silver; and forming an anion exchange membrane by plasma polymerization, so as to yield the solid polymer electrolyte membrane constituted by the anion exchange membrane.

3. The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the common technical feature is a direct alcohol fuel cell with a solid polymer electrolyte membrane being an anion exchange membrane. This cannot be a special technical feature under PCT Rule 13.2 because the element is shown in the prior art.

Sterzel (US 4,828,941) discloses a liquid fuel cell with methanol as the liquid fuel in a methanol/air fuel cell with an anion exchange polymer membrane (column 1, lines 29-40; column 2, lines 52-64).

4. During a telephone conversation with Mr. Moshe K. Wilensky on February 24, 2009 a provisional election was made with traverse to prosecute the invention of Group II, claims 7-8 and 15-17. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-6 and 9-14 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

6. The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder**. Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

7. Applicant's election with traverse of Group II of the prior restriction requirement in the reply filed on January 5, 2009 is acknowledged. The traversal is on the ground(s) that the subject matter is sufficiently related that a thorough search for the subject matter of any one group of claims would encompass a search for the subject matter of the remaining claims, thus a search and examination of the entire application could be made without burden. This is not found persuasive because the groups require a search of different catalyst materials, Groups I and III being a metal complex and Groups II and IV being silver, and Groups III and IV require searching for methods of manufacturing the fuel cell such as for Group III firing the metal complex and forming the membrane by plasma polymerization and for Group IV forming the membrane by plasma polymerization to yield an anion exchange membrane.

Priority

8. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 7 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Scott et al. (WO 2004/021486).

Regarding claim 7, Scott et al. discloses a direct alcohol fuel cell, with methanol or ethanol as the fuel, comprising an anode outer layer (32) of oxidation electrocatalyst, a cathode catalyst layer (12), and a membrane (6), preferably a polymer membrane, arranged between the anode and the cathode, the direct alcohol fuel cell generating electricity by supplying the anode with aqueous methanol solution; wherein the electrolyte is an anion exchange membrane; and the electrocatalyst for the reduction of oxidant at the cathode may be silver (Ag) (figure 2; page 2, lines 16-25; page 10, lines 13-25; page 18, lines 4-8; page 20, lines 1-9; page 21, lines 18-19; page 24, lines 14-25; page 25, lines 1-25; page 29, lines 1-6; page 30, lines 22-25; page 32, lines 1-15).

Regarding claim 17, Scott et al. discloses the alcohol is methanol or ethanol (page 2, lines 16-25; page 10, lines 13-25).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al. (WO 2004/021486) as applied to claims 7 and 17 above, and further in view of Mao et al. (US 6,238,534).

Scott et al. discloses a cathode catalyst layer (12) and the electrocatalyst for the reduction of oxidant at the cathode may be silver (Ag) (figure 2; page 18, lines 4-8; page 29, lines 1-6; page 30, lines 22-25), but is silent as to the cathode catalyst layer (12) containing a carrier catalyst having a carbon material carrying the silver.

Mao et al. teaches a cathode layer for a MEA in a fuel cell comprising catalyst supported on carbon particles, because the carbon particles provide mechanical support and necessary electrical conductivity within the electrode layer (column 5, lines 38-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to support the silver catalyst on carbon particles in the cathode catalyst layer, because Mao et al. teaches the carbon particles provide mechanical support and necessary electrical conductivity within the electrode layer when a catalyst is supported on carbon particles in a cathode (column 5, lines 38-50).

14. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al. (WO 2004/021486) in view of Mao et al. (US 6,238,534) as applied to claims 7, 8 and 17 above, and further in view of Fleischer et al. (US 2002/0127474)

Scott et al. discloses an anion exchange membrane as an electrolyte may be solid, preferably a polymer membrane (page 20, lines 1-25; page 21, lines 1-22), but is silent as to the anion exchange membrane being constituted by a polymer compound having a cation group within a molecule.

Fleischer et al. teaches anion exchange membranes based on quaternary ammoniums, with alkyl chains, (Applicant's polymer compound having a cation group within a molecule) being used in methanol fuel cells, because the anion exchange membranes appear to be good candidates for limiting fuel crossover in methanol fuel cells (paragraph 17). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an anion exchange membrane based on quaternary ammoniums, with alkyl chains (Applicant's polymer compound having a cation group within a molecule), because Fleischer et al. teaches the anion exchange membranes, such as those based on quaternary ammoniums, with alkyl chains, (Applicant's polymer compound having a cation group within a molecule) appear to be good candidates for limiting fuel crossover in methanol fuel cells (paragraph 17).

15. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Scott et al. (WO 2004/021486) in view of Mao et al. (US 6,238,534) and Fleischer et al. (US 2002/0127474) as applied to claims 7, 8, 15 and 17 above, and further in view of Uchida et al. (JP2004134132 please see JPO IPDL machine translation for citation).

Scott et al. discloses a cathode catalyst layer (12) and the electrocatalyst for the reduction of oxidant at the cathode may be silver (Ag) and an anion exchange

membrane as an electrolyte may be solid, preferably a polymer membrane, providing selective transport of negatively charged ions (figure 2; page 18, lines 4-8; page 20, lines 1-25; page 21, lines 1-22; page 29, lines 1-6; page 30, lines 22-25), but is silent as to the cathode catalyst layer (12) containing an anion exchange resin as a binder.

Uchida et al. teaches an air pole (cathode) of a fuel cell with ion exchange resin being used as a binder for the electrode, because the inside of the electrode catalyst layer may all act as a reaction field (paragraph 19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an ion exchange resin as a binder for the cathode catalyst layer, because Uchida et al. teaches that the inside of the electrode catalyst layer may all act as a reaction field when ion exchange resin is used as a binder (paragraph 19).

Scott et al. modified by Uchida et al. teaches ion exchange resin being used as a bind for the cathode electrode, but is silent as to the ion exchange resin being anionic.

Scott et al. discloses an anion exchange membrane as an electrolyte may be solid, preferably a polymer membrane, providing selective transport of negatively charged ions (page 20, lines 1-25; page 21, lines 1-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize an anionic exchange resin as the binder for the cathode catalyst layer, because Scott et al. discloses anion exchange provides selective transport of negatively charged ions (page 20, lines 1-25; page 21, lines 1-22).

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine Turner whose telephone number is (571)270-5314. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571)272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T./
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795